Mark Scheme (Results)

Summer 2018

Pearson Edexcel GCSE in Computer Science (1CP1/01)
Paper 1: Principles of Computer Science

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.

- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.

- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.

- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	One from: • 300 x 200 (1) • 200 x 300 (1) • 60000 (1)	Award mark if result is incorrect but expression is correct. E.g. 300 x 200 = 500	**1**

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	Any three from: • All colours are combinations of RGB (1) • Each of R, G, B is 8 bits / 8 bits are allocated to the three primary colours, red, green, blue (1) • 3 colours x 8 bits each = 24 bits (1) • 2^{24} colours can be represented (1) • 24-bits are used to represent the colour of each pixel (1)		**3**

Question Number	Answer	Additional Guidance	Mark
1(b)	One mark for each pair of digits in the correct location. • 5F 9E A0		**3**

Question Number	Answer	Additional Guidance	Mark
1(c)	One mark for each correct cell. 	HQ or MQ	NQ and (HQ or MQ)
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0	0
1	0
1	0
1	0
0	0
1	1
1	1
1	1		Award alternative representations of 0 and 1: 0 = OFF / FALSE / NO 1 = ON / TRUE / YES	**6**

Question Number	Answer	Additional Guidance	Mark
2(a)(i)	One mark for each correct nibble (4-bits) in the correct position. • 0011 1100	• Leading 0s required	**2**

Question Number	Answer	Additional Guidance	Mark
2(a)(ii)	One mark for each correct digit in the right position. • 35		**2**

Question Number	Answer	Additional Guidance	Mark
2(a)(iii)	One mark for each correct nibble (4-bits) in the correct position. • 0110 1101	• Leading 0s required	2

Question Number	Answer	Additional Guidance	Mark
2(b)(i)	A response such as: A sensor (1) could be used (with a microprocessor) to determine light levels (1) to activate a switch / turn on/off the headlights (1)	Accept responses that refer to any system that takes input, carries out a process and provides an output. Without a process, this essentially becomes a switch.	**3**

Question Number	Answer	Additional Guidance	Mark
2(b)(ii)	5-bits are needed. (1) And one from: • Because 4-bits / 2^4 only represents 16 values (1) • Because 5-bits / 2^5 represent up to 32 values (1)		**2**

Question Number	Answer	Additional Guidance	Mark
2(c)(i)	C – to keep data secure (1)		**1**

Question Number	Answer	Additional Guidance	Mark
2(c)(ii)	One mark for each correct cell, in the correct place. • f v e o i w (1) • -2 (1)		**2**

Question Number	Answer	Additional Guidance	Mark
2(c)(iii)	When the start/end of the alphabet is reached (1) the algorithm must roll over (1)		**2**

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	Any two from different categories: • Share peripherals/devices (e.g. printers, scanners) (1) • Communicate (e.g. email, instant messaging, play games) (1) • Share data (e.g. files/music/videos/backups on servers) (1) • Deploy/update applications (1)		**2**

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	Any three from: • May not have space for cables to be installed (1) • Employees and visitors can move around the building without disconnecting (1) • Adding new users just means giving out the SSID and password (1)		**3**

Question Number	Answer	Additional Guidance	Mark

3(b)(i)	Most people do not notice (1)
	
	And one from:
	…because:
	• People have a limited hearing range (1)
	  OR
	• Sounds (frequencies/amplitudes) can be masked by other sounds (1)
	  OR
	• People's brains will 'fill in the blanks'
		Max 1 mark without first statement.	**2**

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	May increase the file size / the file may not be compressed very much/at all (1) if characters are distributed randomly/not repeated/no runs of similar characters are found (1).		**2**

Question Number	Answer	Additional Guidance	Mark
3(c)	Total number of bits to transfer: 1 mark for 81 x 1024^2 1 mark for x 8 Speed in bits per second: 1 mark for 54 x 1000^2 Time = number of bits / bits per second: $$\frac{81 \times 1024 \times 1024 \times 8}{54 \times 1000 \times 1000}$$ 1 mark = number of bits in numerator 1 mark = number of bits per second in denominator	• No units required • Any equivalent expression to be awarded	
			5

Question Number	Answer	Additional Guidance	Mark
4(a)(i)	A – Solid state (1)		**1**

Question Number	Answer	Additional Guidance	Mark
4(a)(ii)	• ROM stores BIOS / bootstrap / start-up (1) • RAM stores **currently executing** programs and data (1)		**2**

Question Number	Answer	Additional Guidance	Mark
4(a)(iii)	• Data (1) • Instructions (1)		**2**

Question Number	Answer	Additional Guidance	Mark
4(a)(iv)	B – Control unit (1)		**1**

Question Number	Answer	Additional Guidance	Mark
4(b)(i)	Any two from: • All processes are held in a queue (1) • Processes are prioritised (1) • (and) Processes are switched (1) • On each clock cycle (1)	• Award explanations if attributable to a bullet point	**2**

Question Number	Answer	Additional Guidance	Mark
4(b)(ii)	C – Converting files (1)		**1**

Question Number	Answer	Additional Guidance	Mark
5(a)	An explanation that makes reference to one of these types of access: • Read only • No access And includes a linked reason: • The student cannot see any **sensitive/irrelevant information** • The student does not accidently change/delete the data • The student cannot share the data (outside the organisation) •		•

Question Number	Answer	Additional Guidance	Mark
5(b)	D – Unpatched (1)		**1**

Question Number	Answer	Additional Guidance	Mark
5(c)	- Disposal of digital devices in a landfill (1) could cause dangerous chemicals/toxins to leak (1) into drinking water (1). - Reclaiming precious metals (1) exposes workers to more dangerous chemicals/materials (1) by contact during handling (1). - Incineration of digital devices (1) causes chemicals/toxins to be released into the air (1), which could then be inhaled (1) - If batteries are not removed / thrown in bin (1) they can catch fire (1) creating a risk of burns (1)	All points must be connected to human health, not just to environmental damage alone Max 2 marks per bullet point.	4

Question Number	Answer	Additional Guidance	Mark
5(d)(i)	Any two from: Networks are put under deliberate attack (1) in order to identify any weaknesses/vulnerabilities (1) so that they can be fixed (1)		2

Question Number	Answer	Additional Guidance	Mark
5(d)(ii)	Any two from: Identify: 1. bad programming practices (1) 2. inefficient code (1) 3. logic errors (1) 4. programming language-specific vulnerabilities (1) 5. security vulnerabilities		2

Question Number	Answer	Additional Guidance	Mark
6(a)	Any four from: 1. A single executable file is produced (1) 2. The executable program is portable between machines (1) 3. The program source code is not available (1) 4. Code can be optimised/made more efficient (1) 5. Entire source code file is converted at once (1) 6. No special environment is needed to execute the code (1) 7. It creates object/machine code (1) 8. Error report is provided at the end of the compilation (1)		**4**

Question Number	Answer	Additional Guidance	Mark
6(b)	A description to include five from: 1. Reads the data/packet to find the recipient's address (1) 2. Has physical connections to >=2 different networks (1) 3. Holds a routing table (1) 4. Stores information about (IP) addresses (1) 5. Keeps packets inside a network by not forwarding them (1) 6. **Forwards** data / directs/forwards/sends packets (1) [Not 'directs data' as in question] 7. Chooses the most efficient path to the next node (1)		**5**

Question Number	Answer	Additional Guidance	Mark
6(c)	Best case: The item is the middle/median of the list (1). Worst case: The item is not in the list / located at the point at which the final division could be made (1).	Do not accept last/first item in the list.	**2**

Question Number	Answer	Additional Guidance	Mark
6(d)	Indicative content 1. All of the items appear to be stored on one single device. 2. The virtual device appears to be storage on the local machine. 3. Software sits between the physical devices and the user. 4. The items stored on the cloud could be scattered over several different physical hard discs/servers. 5. The items stored on the cloud could be resident in different locations. 6. Files need to be accessed via a network/internet. 7. Procedures (e.g. backup) happen without the end user being aware or involved.		**6**

Level	Mark	Descriptor
	0	No rewardable content.
Level 1	1–2	Basic, independent points are made showing elements of knowledge and understanding of key concepts/principles of computer science. The discussion will contain basic information with little linkage between points made.
Level 2	3-4	Demonstrates adequate knowledge and understanding of key concepts/principles of computer science. The discussion shows some linkages and lines of reasoning with some structure.
Level 3	5-6	Demonstrates comprehensive knowledge and understanding by selecting relevant knowledge and understanding of key concepts/principles of computer science to support the discussion being presented. The discussion shows a well-developed, sustained line of reasoning which is clear, coherent and logically structured.